In Situ Catalyst and Materials Characterization by Near Edge X-ray Absorption Fine Structure (NEXAFS)

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Developed and test a methodology for a first stage prototype combinatorial (high throughput) chemistry experiment using the soft x-ray material characterization facility developed in FY96-99. This was be accomplished by rapidly measuring NEXAFS (selected narrow energy regions) intensities of specific chemical bonds of gases chemisorbed *on and in catalysts* and analyzing the subsequent data stream. Our first experiment was apply the *"rapid NEXAFS technique" using* propylene adsorption (*quasi titration experiment*) to probe the acidity and reactivity of ZSM-5 zeolites (as many as 10 samples at a time) over a wide range of silica to alumina ratios, which vary the zeolite acidity. Zeolite acid strength directly correlates to cracking activity and product distribution, both are important in industrial processes. Current, acidity determination involves multiple methods, which are often slow and indirect.